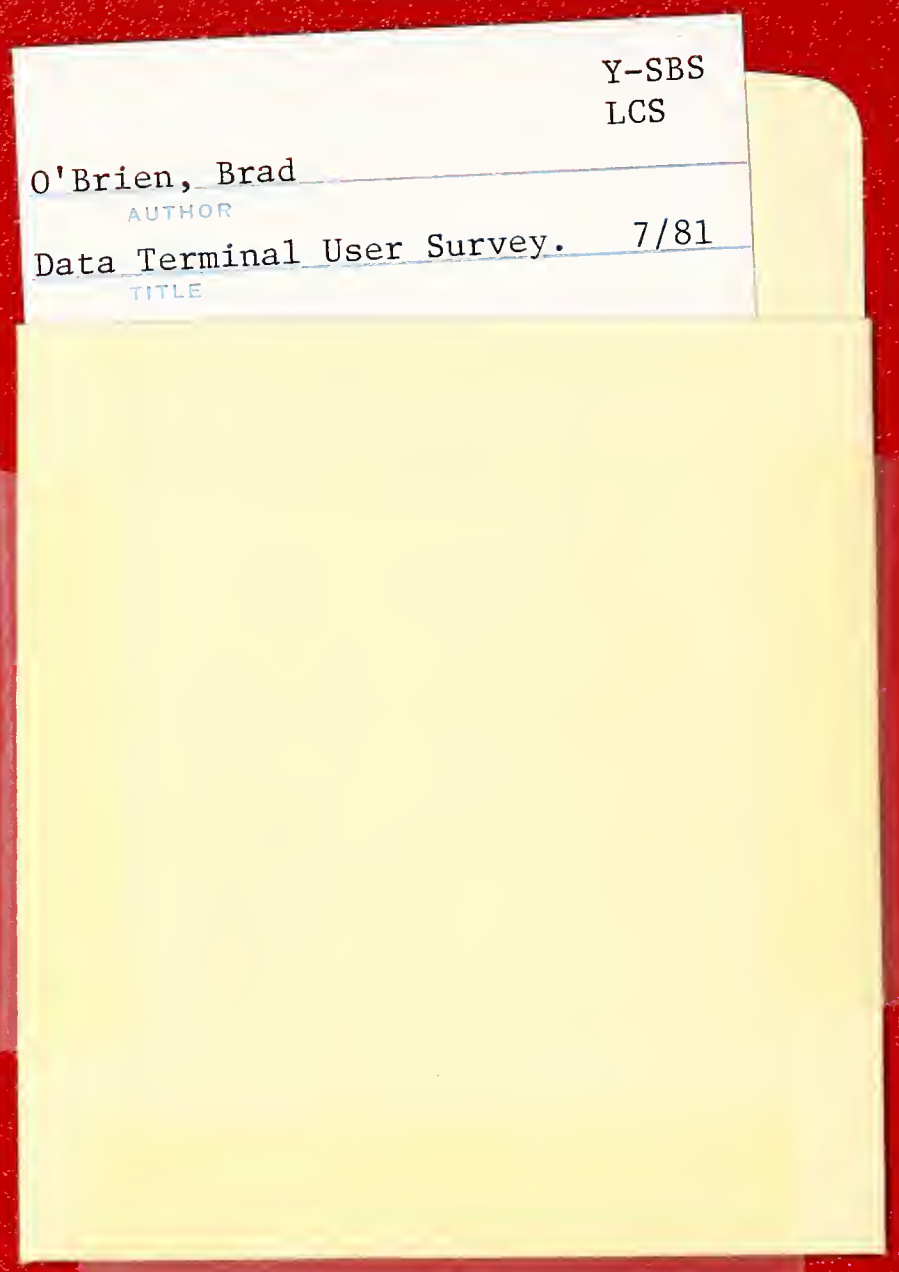
DATA TERMINAL USER SURVEY


Y-SBS
LCS
O'Brien, Brad
AUTHOR
Data Terminal User Survey. 7/81
TITLE

DATA TERMINAL USER SURVEY

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SATELLITE BUSINESS SYSTEMS

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DATA TERMINAL USER SURVEY

ABSTRACT

A study of data communication terminal installations in a metropolitan area using Atlanta as a model. Results included estimates of the installed terminal population in Atlanta, the number of terminals per employee in various types of business establishments and the traffic volume per terminal and per location. A total of 66 establishments with terminals were interviewed.

DATA TERMINAL USER SURVEY

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1 INTRODUCTION

I INTRODUCTION

A. OBJECTIVES

- The primary objective of this study of Data Terminal Users was to establish sufficient information to form a preliminary model of data communication service requirements and volumes in metropolitan areas around the United States.

- Specific data included in this model are as follows:

  - The estimated number of data communication terminals installed in various types of establishments in a metropolitan area. This data is expressed in the report as employees per terminal for different types of industries and establishments.

  - The volume of data traffic between terminals and computers expressed in minutes of traffic per day. Another qualification to these data is the typical transmission speed for different types of applications.

  - An examination of the types of data communications applications performed by the terminals and data communications systems examined.

- An examination of the types of data communication facilities and networks utilized by the various terminals and applications.

- An examination of the geography of the data communication network to which these local data communication terminals are attached. In particular, this examines the transmission distance involved between data communication locations.

B. METHODOLOGY

- The study was conducted using the Atlanta SMSA (Standard Metropolitan Statistical Area) as a sample area.

- The Atlanta SMSA was selected for the following reasons.

  - Atlanta is a relatively "free-standing" city with no nearby metropolitan areas to distort the traffic pattern in and out of Atlanta.

  - A number of other studies have been conducted in the Atlanta area, particularly an extensive study performed on the Atlanta communication market for a NASA-sponsored demand study for a new 30/20 GHz domestic satellite service.

  - Atlanta represents a fairly significant hub for most nationwide types of businesses and it is also one of the very rapidly growing large metropolitan areas in the United States.

  - Atlanta, on the other hand, is somewhat distorted because of the large local-calling areas provided by Bell Telephone Company. The Atlanta local-calling area is the largest such local-calling area in the U.S. and is a major geographic percentage of the 404 area code.

- The study was accomplished by means of a telephone interview program. A total of 78 telephone interviews were conducted with a total of 66 different establishments, most of them separate companies.

  - These selected companies were not randomly selected but were biased strongly toward these large-size companies with a high probability of having a terminal installed. While this complicates the process of extrapolating from the sample to the total metropolitan area, it, on the other hand, provides a much better picture of applications, traffic volumes, equipment installed.

  - A total of over 175 telephone contacts were made with Atlanta establishments, but only the 66 establishments which had at least one data communication terminal installed were interviewed in detail.

- In most cases the individual interviewed was the person responsible for data processing in that organization. However, information was obtained from that individual also for other types of applications, such as message terminals.

- An extensive amount of secondary information was obtained both prior to and subsequent to the telephone interview program. This data included the following key elements:

  - The previously mentioned NASA study performed by ITT.

  - A number of lists of establishments in the Atlanta area, including a Dun and Bradstreet listing provided by SBS, a number of employer directories provided by the Atlanta Chamber of Commerce and the Atlanta Regional Plan Commission, a street list published by the Haines Company.

  - A number of census and demographic materials were utilized, primarily the County Business Patterns Study of the U.S. Census Bureau.

- A number of maps of the Atlanta SMSA were obtained from a variety of sources.

II EXECUTIVE SUMMARY

A. MAJOR CONCLUSIONS

- There is approximately one terminal installed for every 19 employees in the average establishment which has any terminals installed.

  - Approximately two-thirds of the establishments larger than 50 employees have at least one terminal installed.

  - Of the 66 establishments interviewed in detail, the number of terminals installed ranged from 1 to 311.

  - In addition to the 66 establishments interviewed, over 100 other establishments were questioned as to whether or not they had any terminals installed and were rejected because the answer to that question was "none."

- From this data an estimate was made placing the total terminal population for the Atlanta SMSA at approximately 21,000 terminals.

  - This correlates reasonably well, given the level of accuracy of the survey technique, with the relationship between market estimates of the total terminal market (about 2 million currently) and the Atlanta employment population (1.2% of the total U.S).

- A total of 1,365 data terminals were stated to be installed in the establishments interviewed. Of these 1,018, 75% were local terminals communicating directly with a co-located computer facility. This percentage is higher than might be expected due to the survey focus on larger establishments.

  - Of the remote communicating terminals (a total of 347), 40% were connected to a remote computer by dial-up facilities and the other 60% were connected by means of private-line facilities.

- The probability of terminals being installed in a given establishment is very much related to the size of the establishment.

  - In those establishments with over 1,000 employees, every location had at least one terminal installed.

  - The probability of terminals being installed dropped sharply as the size of the establishment reached less than 250 employees.

  - Although very few interviews were conducted in establishments smaller than 50 employees, the probability of terminals being installed in such establishments is sufficiently close to zero to be assumed to be zero.

- Most of the locations interviewed which had data communication terminals also had a computer center of some level at the same location.

  - Forty-eight (48) of the 66 companies has a computer installed at that establishment.

- Most of the computers installed had some level of remote communication capability, that is to another, usually larger, computer or to a number of remote data terminals.

  - Thirty-four (34) of the 48 computer systems installed at the interviewed establishments had remote communication capability at that computer.

- This communication capability included both dial-up and private lines.

- Traffic volume of dial-up terminals ranged from 90 to 120 minutes per day.

  - Very little traffic volume data were obtained from the private-line users.

  - The traffic volume ranged from zero (for back-up dial lines) to seven hours a day (for on-line data base applications) of connect time.

- Dial connected devices (both terminals and CPUs) transmitted at either 300/1,200 or 2,400 bps. Most devices communicating by means of private line transmitted at 2,400 or 4,800 bps.

- The volume of data communication traffic in and out of an establishment is strongly influenced by the presence of a computer at that establishment serving terminals at remote locations.

  - Considering dial-connected devices, the computers communicating with remote terminals represent a total of 74% of the volume of traffic (minutes per day) of the establishments interviewed. Twenty-two percent (22%) of the traffic volume is attributable to terminals at that establishment communicating with a remote computer, while 4% is attributable to computer-to-computer dial connections.

  - In the case of private-line connected devices, 89% of the traffic volume is between a local CPU and remote terminals, whereas 10% is between local terminals and a remote CPU, and only 1% is between CPUs.

- Most of the applications for data communication terminals on dial-up connections are operational-type business applications, such as orders, billing, etc., as opposed to analytical or other timesharing-type applications.

- The geography and traffic volume of typical data communication networks tends to be very heavily oriented toward short distances.

  - Almost half of the total traffic volume examined in this study remained within the Atlanta metropolitan area.

  - Less than 15% of the total data communication traffic is transmitted over distances of 1,000 miles or more.

  - Little relationship was apparent between distance and the terminals or types of establishments.

B. RECOMMENDATIONS

- Given that the primary determinant of profitability of a new communication service will be traffic volume, the basic recommendation is that the primary locations to be addressed by the service should be those with medium to large computer centers. This recommendation is premised on the observation that the largest traffic volume locations are those with computer centers serving numbers of remote terminals.

- While the present economics of dial-up transmission facilities in the Atlanta area are distorted by the very large local-calling area, it can be anticipated from trends in the rest of the Bell System and other telephone carriers that this local-calling will be much more limited in the near future, thus making alternative data communication services more viable.

- Remote computing service vendors will be facing a number of significant changes in network economics with changes in Bell Private Line and WATS tariffs and the anticipated change which can be expected in the Atlanta local-calling area mentioned above. In that these RCS vendors represent extremely high-traffic volume generators, they represent ideal business opportunities for new data communication services.

- Although very high volumes of traffic are generated by the private line devices, it could be anticipated that with an appropriate data communication service capability (for example a fast polling, virtual circuit capability) this private-line market may be highly addressable by a new communication service. This is again pertinent in the light of announced and anticipated changes in the relative costs of private lines versus other alternatives.

- Voice grade transmission speeds (1,200, 2,400, and 4,800 bps) are by far the most common transmission speeds.

- In that no significant difference was found in the density (i.e., terminals per employee) of terminals between large-and medium-size establishments (for those establishments with terminals) the large (over 1,000 employees) establishments, even though few in number, represent a market potential (in terms of both terminals and traffic volume) of almost half of the total metropolitan area market.

- The establishments of large corporations tend to implement their long-distance communications, including dial-up communications, on the corporate communication networks. As such, these establishments would have to be addressed from a national account level.

III DETAILED FINDINGS

III DETAILED FINDINGS

A. CATEGORIES OF DATA COMMUNICATION INSTALLATIONS

- While the primary focus of the study was dial-up connected, data communication terminals, these need to be placed in a total perspective of all types of data communicating devices and terminal installations.

- Referring to Exhibit III-1 we can distinguish four different types of terminal and computer interconnections.

  - Category 1 - Local terminals communicating with a remote computer. This is the primary focus of this study.

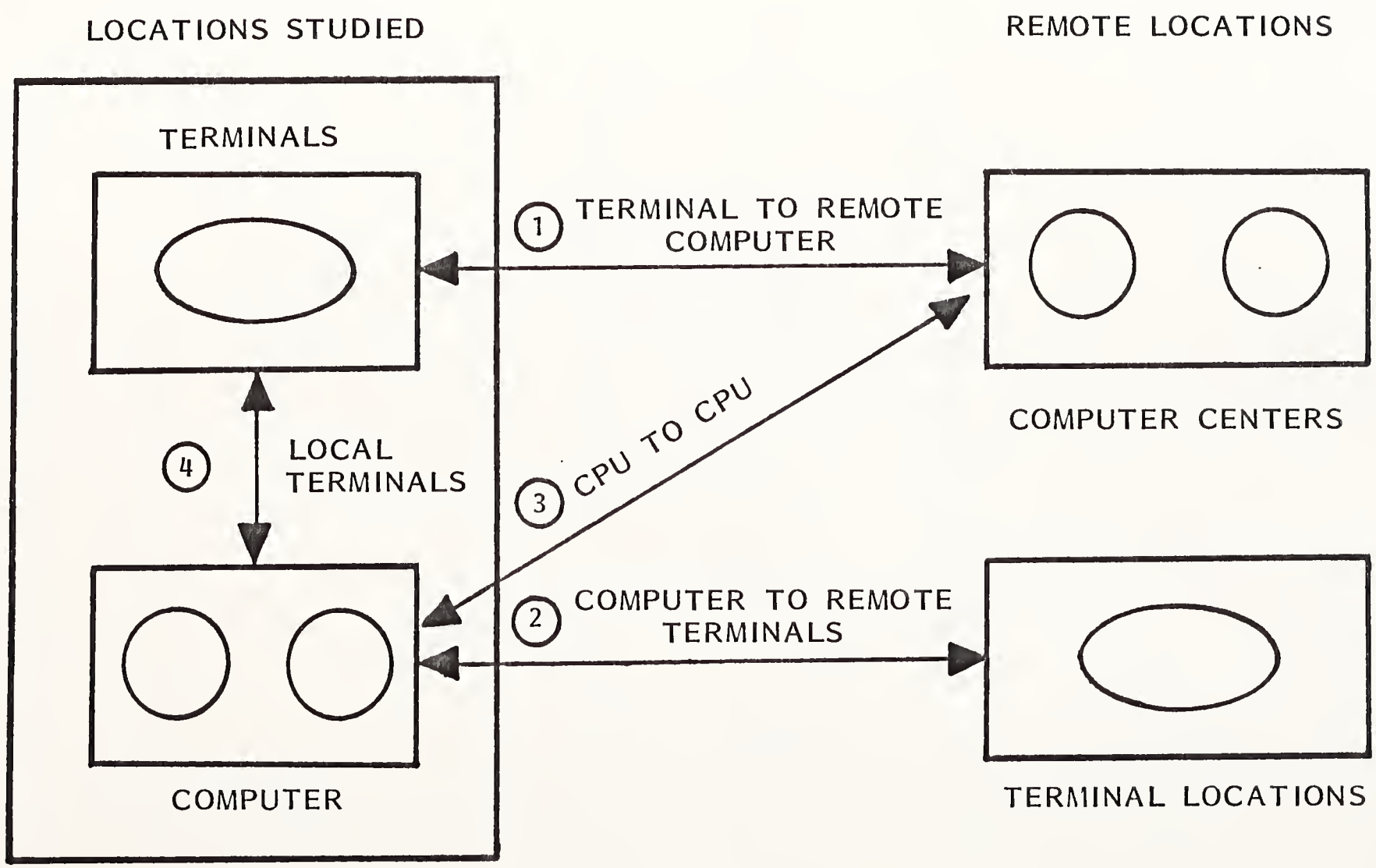
  - Category 2 - Terminals at a remote location communicating with a CPU at the establishment being investigated.

  - Category 3 - A CPU at the local establishment communicating with a remote CPU.

    . Each of these three categories of remote data communications can be implemented by means of either dial-up transmission or private lines. In this study, both types were found for each of the three categories.

EXHIBIT III-1

CATEGORIES OF DATA COMMUNICATION INSTALLATIONS



- Category 4 - Local data communication terminals communicating with a CPU at the same business establishment.

- For purposes of defining installed terminals at an establishment, categories 1 and 4 were the only ones considered.

- In Exhibit III-2 are shown the number of devices established from the interviews with the 66 establishments.

  - The right-hand column shows the total number of establishments interviewed. This number adds up to more than the total of 66 since in most establishments more than one category of data communications was included.

  - Usually within any one category only dial-up or private-line networks were utilized, but not both.

- As mentioned previously, Catagories 1 and 4 were totaled to establish the number of terminals installed. It is from this sum of 1,365 total terminals that the estimates of terminals per employee were established.

- In the case of Category 3, "CPU to CPU" the numbers represent communication lines rather than terminals.

- In the case of Category 2, "Computers to Remote Terminals," the count of remote terminals is probably low in that the respondent at one location is answering for the total number of terminals at remote locations, many of which are somewhat unfamiliar to him.

EXHIBIT III-2

CATEGORIES OF DATA COMMUNICATION INSTALLATIONS

CATEGORY	NUMBER OF DEVICES		NUMBER OF LOCATIONS
1 TERMINAL TO REMOTE COMPUTER	347	TOTAL	35
	137	DIAL UP	17
	210	PRIVATE LINE	21
2 COMPUTER TO REMOTE TERMINALS	1,793	TOTAL (REMOTE TERMS)	18
	359	DIAL UP	11
	1,434	PRIVATE LINE	11
3 CPU TO CPU	24	TOTAL	17
	13	DIAL UP	8
	11	PRIVATE LINE	9
4 LOCAL TERMINALS	1,018		39

B. DENSITY OF TERMINAL INSTALLATIONS

- Taking the census of terminals as shown in Exhibit III-2, and specifically the Category 1 and 4 terminals, and distributing these by types of establishments, the study developed an estimate for the density of terminal installations for different types of locations. The data are shown in Exhibit III-3 and expressed in terms of number of employees per terminal.

- While the overall average is 19 employees per terminal, it ranges from a high density of seven employees per terminal in data processing installations to a low density of 75 employees per terminal in warehouse locations.

- Since terminal installations are growing at a 20 to 25% annual rate while employment is only growing at about 5%, the number of employees per terminal will decline to about 12 employees per terminal in 1985.

C. DATA TERMINAL MARKET ESTIMATE

- The sampling technique was not primarily designed to produce an estimate of the total market for the metropolitan area, but rather to establish some characteristics of that market and its requirements in terms of volume and density per establishment, etc. However, using the data developed it was possible to produce an estimate of the size of this total market for data terminals.

- As shown in Exhibit III-4, a combination of census figures and survey figures allows us to produce an estimate of approximately 21,000 terminals installed in Atlanta establishments.

- The first line, "Number of Establishments," is derived from the 1976 County Business Pattern publication of the U.S. Bureau of Census.

EXHIBIT III-3

DENSITY OF TERMINAL INSTALLATIONS

TYPE OF LOCATION	EMPLOYEES / TERMINAL
MANUFACTURING	40
WAREHOUSE	75
ADMINISTRATION	17
SALES	24
BANKING	15
DATA PROCESSING	7
OVERALL AVERAGE	19

EXHIBIT III-4

DATA TERMINAL MARKET ESTIMATE
IN ATLANTA SMSA

	SIZE OF ESTABLISHMENTS (NUMBER OF EMPLOYEES)						
	<50	50 99	100 249	250 499	500 999	>1,000	TOTAL
NUMBER OF ESTABLISHMENT	35,000	1,087	668	206	65	44	37,070
PROBABILITY OF TERMINALS	0	50	65	85	95	100	3
NUMBER OF ESTABLISHMENTS WITH TERMINALS	0	550	434	175	62	44	1,260
NUMBER OF TERMINALS PER ESTABLISHMENTS @ 19 EMPLOYEES/TERMINAL		4	9	20	40	200	
TOTAL TERMINALS INSTALLED		2,200	3,900	3,500	2,400	8,800	20,800

- The second line, "The Probability of Terminals," relates to the estimate which the INPUT interviewers made based on the initial response in telephone calls to the existence or non-existence of terminals in different size establishments.

  - It should be noted that very few establishments under 50 employees were interviewed and the zero probability is primarily an assumption.

- The "Number of Establishments With Terminals" is simply a product of the first two rows.

- The "Estimate of the Number of Terminals Per Establishment" is premised on the observation that there was little or no differentiation in terminal density with the size of the establishment. Therefore, this line represents an approximate division of 19 employees per terminal into the average size of the establishments in each of the respective size categories.

- The final row, "Total Terminals Installed," is a simple multiplication of the prior two rows with a total of 20,800 terminals as the estimate of the total market, or approximately 21,000.

- The ITT/NASA study indicates Atlanta employment currently at about 1.2% of total U.S. employment. Using this figure against the estimate of approximately 2 million installed U.S. wide would produce a figure of 24,000 for the Atlanta marketplace. Given the method of sampling of the survey data, these numbers compare reasonably well.

D. TERMINAL APPLICATIONS

- In the course of the interview, respondents were asked to provide further information of their use of dial-up terminals. Exhibit III-5 shows a classification of these applications into a few generalized categories.

EXHIBIT III-5

TERMINAL APPLICATIONS
(DIAL-UP TERMINALS ONLY)

	NUMBER OF LOCATIONS
FINANCIAL BILLING, PAYROLL, OTHER ACCOUNTING, ETC.	11
OPERATIONS ORDERS, PRODUCTION CONTROL, ETC.	7
ADMINISTRATION PERSONNEL, MISCELLANEOUS REPORTS	6
PROGRAM DEVELOPMENT	4
ANALYTICAL TIMESHARING	5
APPLICATION BASED REMOTE COMPUTING SERVICES	8

- The primary observation which can be made from this data is that the vast majority of the applications described, even for dial-up applications, are very much in the category of operational type applications, as opposed to analytical or typical timesharing applications.

  - It can be assumed, although data was not obtained on this point, that the private-line applications tend to be even more of a regular and, therefore, operational kind of application.

E. COMPUTER INSTALLATIONS AT THE LOCATIONS STUDIED

- Although the original intent of the study was not to examine computer installations, it turned out that of the 66 locations studied which had terminals installed, 48 of those locations also have computers of some size co-located.

- While most of these computers were relatively small (System 34s, System 3s, etc.) it showed that 18 of these computers were primarily installed to provide computing services to remote terminals. Of those 18, five were installed at the establishments of remote computing service vendors and these five served a total of 678 remote terminals primarily in Atlanta or the southeastern United States.

- Most (40) of the 48 computers installed served such local terminals at these 40 sites co-located at the same establishment. There were a total of 1,018 such local terminals at these 40 sites. As previously noted, these local terminals form a sizable percentage (75%) of the total number of terminals installed in the 66 establishments interviewed.

- Seventeen (17) of the 48 computers have regular communication requirements to remote computers. Usually these remote computers tend to be larger systems which support special applications, particularly data bases, for the small computers located at the sites interviewed.

- Only 14 of the 48 computers had no remote data communications installed. That is, these 14 computers served only local terminals at the establishment interviewed.

- These conclusions are shown in Exhibit III-6.

F. TRAFFIC VOLUME

- A primary objective of the study was to establish the traffic volume of terminal users. Accurate information was obtained from a sizable percentage of the respondents with dial-up traffic volume. Little information was obtained from the users with private-line terminals.

- Using the same categories described before, Exhibit III-7 shows the average traffic volume in minutes per day for the total location and for the terminals at different locations.

  - In this case the remote computing service vendors who would otherwise significantly distort the second category that is, "Computers To Remote Terminals," are removed from that category and shown separately as the last category.

  - A similar distortion appears in Category I where one large company has a total of 45 dial-up terminals installed communicating to two computer centers in the upper midwest.

- In order to alleviate these distortions, a summary was prepared showing the mix of traffic volume for the different categories based on the minutes per terminal rather than minutes per location. This data is shown in Exhibit III-8.

- In Exhibit III-8 the total traffic volume for all of the 66 establishments sampled is shown both for dial-up terminals as well as for private-line terminals.

EXHIBIT III-6

COMPUTER INSTALLATIONS AT LOCATIONS STUDIED

- Forty-eight (48) of the 66 locations studied had computers installed.
- Eighteen (18) of these served a total of 1,793 remote terminals.
  - Five (5) of these 18 were commercial RCS vendors serving 678 remote terminals.
- Forty (40) of the 48 computers support a total of 1,018 local terminals.
- Seventeen (17) of these computers communicate with remote CPUs.
- Fourteen (14) of these computers have no remote data communications installed.

EXHIBIT III-7

TRAFFIC VOLUME
(MINUTES/DAY)
(DIAL ONLY)

CATEGORY	AVERAGE MINUTES/ LOCATION	AVERAGE MINUTES/ TERMINAL
TERMINAL TO REMOTE COMPUTER	800	95
COMPUTER TO REMOTE TERMINALS	300	21
COMPUTER TO COMPUTER	250	170
RCS VENDORS	12,000	294

EXHIBIT III-8

TOTAL TRAFFIC VOLUME FOR ESTABLISHMENTS SAMPLED

CATEGORY	DIAL-UP TERMINALS				PL TERMINALS			
	MINUTES/ TERMINALS	TOTAL TERMINALS	TOTAL MINUTES	PERCENTAGE	MINUTES/ TERMINAL	TOTAL TERMINALS	TOTAL MINUTES	PERCENTAGE
Terminal to Remote Computer	95	137	13,015	22%	95	210	19,950	10%
Computer to Remote Terminal	124	359	44,516	74%	124	1,434	177,816	89%
Computer to Computer	170	13	2,210	4%	170	11	1,870	1%
TOTAL			59,741	100%			199,636	100%

- Private-line terminal traffic volumes are assumed to be identical to those of dial-up terminals. This assumption is sufficiently valid to establish percentages for the three different categories of traffic.

- It can be seen from this exhibit that the vast majority of the traffic volume derives from computers serving remote terminals, regardless of whether these remote terminals are served via dial-up facilities or private-line facilities.

  - As noted earlier, the number of terminals served from computer centers interviewed is underestimated by reason of the nature of the locality of the respondent.

- In Exhibit III-9 the transmission speeds of various terminal installations are shown for those where this information was obtained.

  - As shown for most of the dial-up devices, the speed is either 1,200 or 2,400 bits per second, whereas in the private-line case the dominant speed is 4,800 per second.

- If these traffic volumes shown in Exhibit III-7 and III-8 and expressed in minutes per day were converted to bits per second using the transmission speed information from Exhibit III-9, it would show an even higher ratio of traffic volume of private-line terminals to dial-up terminals.

G. NETWORK GEOGRAPHY

- Most of the data communication networks examined were relatively local, as mentioned earlier.

  - Almost half of the traffic volume for dial-up terminals is within the Atlanta metropolitan area, while one-eighth of the traffic goes beyond 1,000 miles.

EXHIBIT III-9

TRANSMISSION SPEEDS

CATEGORY	LINE TYPE	SPEED				
		300	1200	2400	4800	9600
		NUMBER OF TERMINALS				
TERMINAL TO REMOTE COMPUTER	DIAL UP	6	58	4		
	PRIVATE LINE	8	2	31	117	33
COMPUTER TO REMOTE TERMINALS	DIAL UP	55	111	174	16	
	PRIVATE LINE			2	73	90
CPU TO CPU (LINES)	DIAL UP		7	2	1	
	PRIVATE LINE		4	1	1	

- This network geography is shown in Exhibit III-10 by different classes of terminals.

- The types of dial-up network configurations used to carry this traffic are shown in Exhibit III-11.

  - More than half of the terminals connected to these dial-up networks in the study were utilizing long-distance telephone facilities of one kind or another.

H. THE GEOGRAPHY OF ATLANTA

- In Exhibit III-12 it can be seen that the Atlanta 15-county metropolitan area covers a significant fraction of northern Georgia and the 404 area code.

- Exhibit III-13 shows this same 15-county metropolitan area with 10- and 20-mile radius circles drawn from the center of the downtown city of Atlanta.

  - The major areas of new industrial development are in the northwest direction toward Marietta, in the northeast direction toward Norcross and to a lesser extent in the southerly direction into Clayton County.

  - There are a few specific large developing areas such as Conyers and Douglasville.

- The Atlanta local-calling area is cross-lined in Exhibit III-14. This area, noted previously as the largest in the country, consists of the central seven counties of the Atlanta metropolitan area.

EXHIBIT III-10

NETWORK GEOGRAPHY

CATEGORY	TYPICAL GEOGRAPHY COVERED
TERMINAL TO REMOTE COMPUTER	ONE SPECIFIC LOCATION ANYWHERE IN U.S. WITH BIAS TOWARD SOUTHEAST.
COMPUTER TO REMOTE TERMINALS	MULTIPLE LOCATIONS IN SOUTHEAST WITH BIAS TOWARD ATLANTA AREA.
CPU TO CPU	ONE SPECIFIC LOCATION ANYWHERE IN U.S. WITH NO CLEAR BIAS.
RCS VENDORS	ATLANTA AREA OR SOUTHEAST.

EXHIBIT III-11

DIAL UP NETWORK CONFIGURATIONS

TYPE OF LINE	NUMBER OF LOCATIONS	SERVED DEVICES		
		INSTALLED TERMINALS	SERVED TERMINALS	REMOTE COMPUTERS (LINES)
LOCAL CALLS	11	71	153	
LD CALLS	9	11	5	2
WATS	9	2	201	7
CORPORATE NETWORK	4	53	0	0
TOTAL	32	137	359	13

NOTE: SOME OVERLAP OF LOCATIONS

EXHIBIT III-12

ATLANTA SMSA

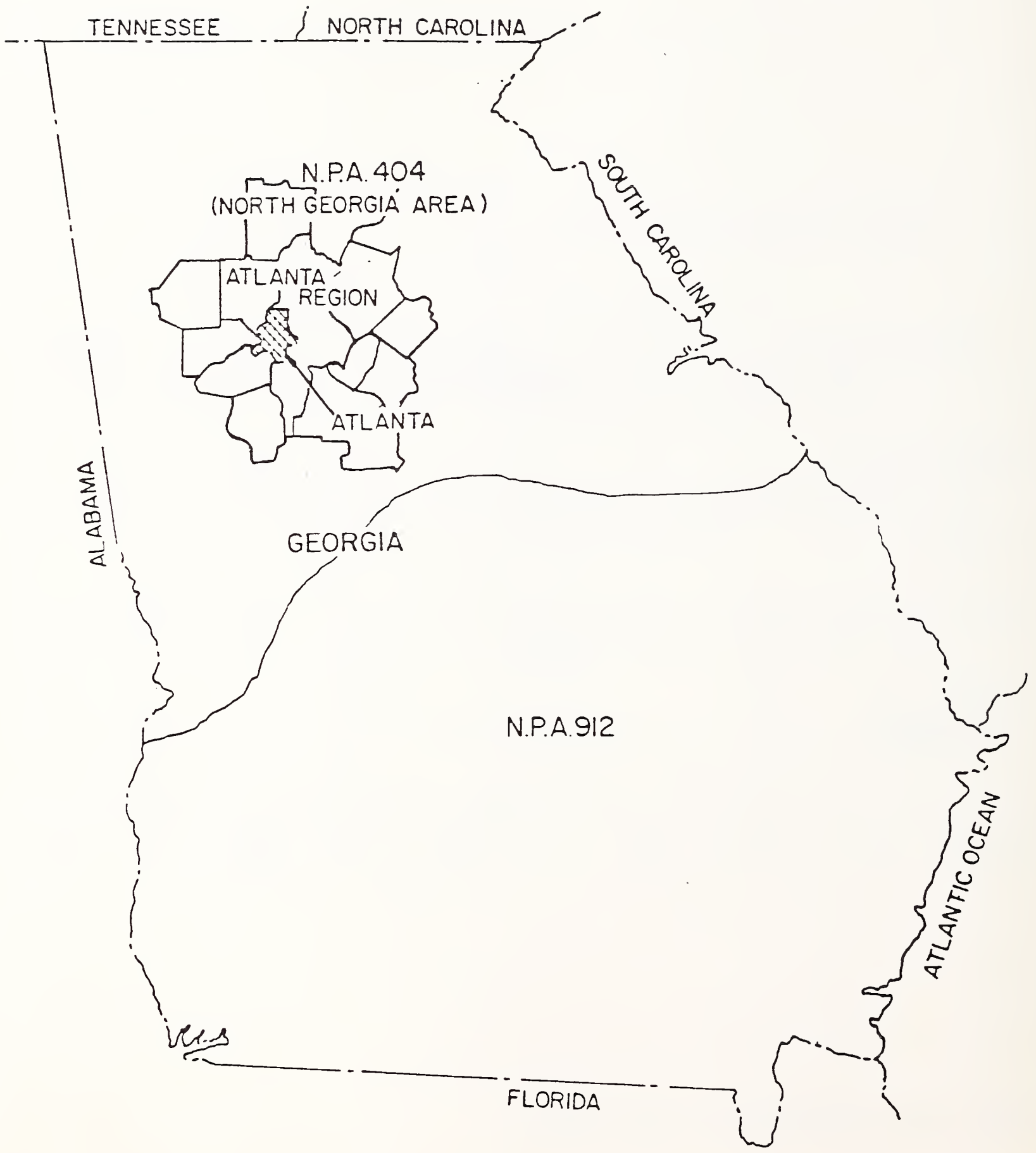
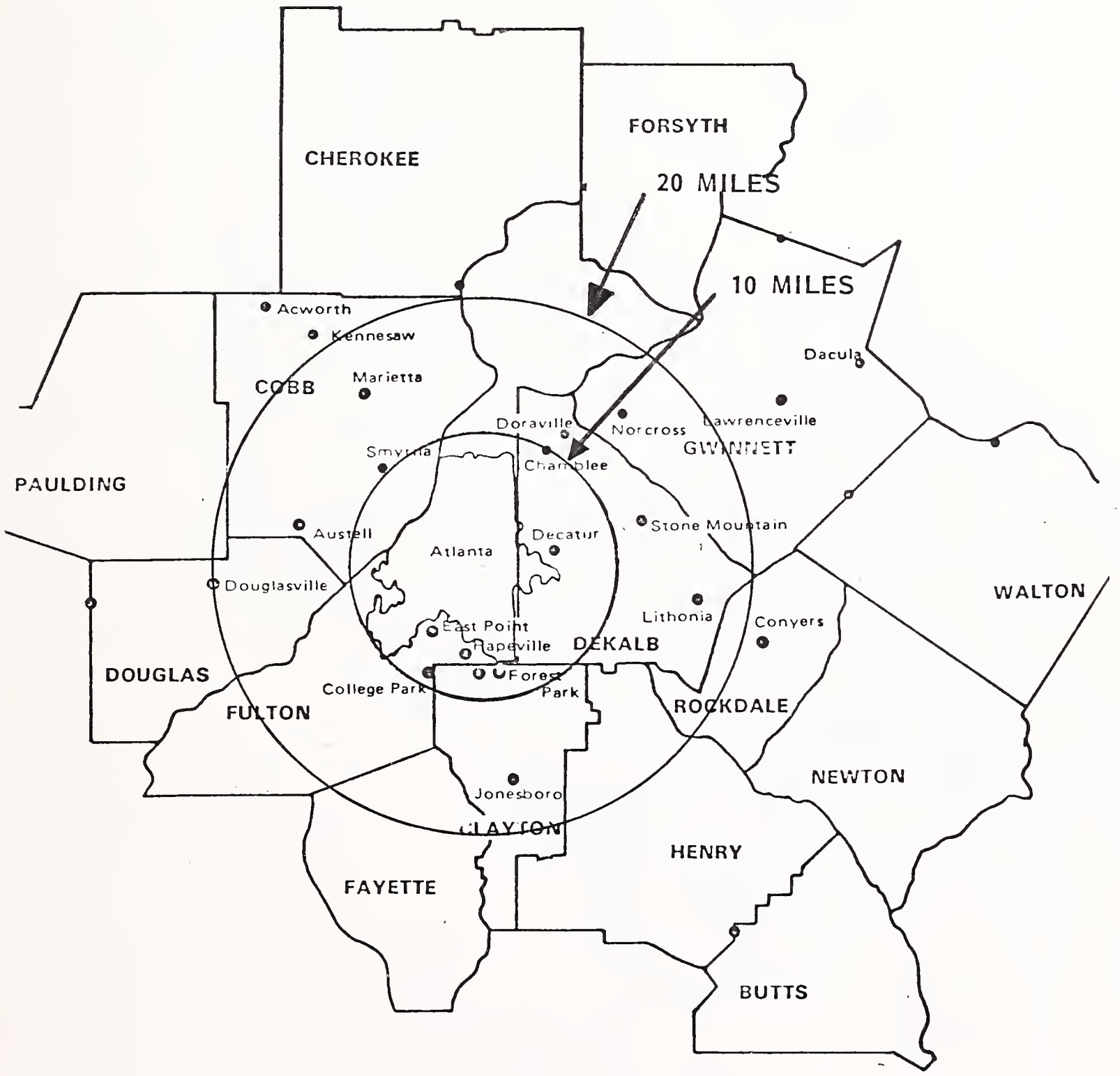


EXHIBIT III-13

Fifteen-County Atlanta SMSA

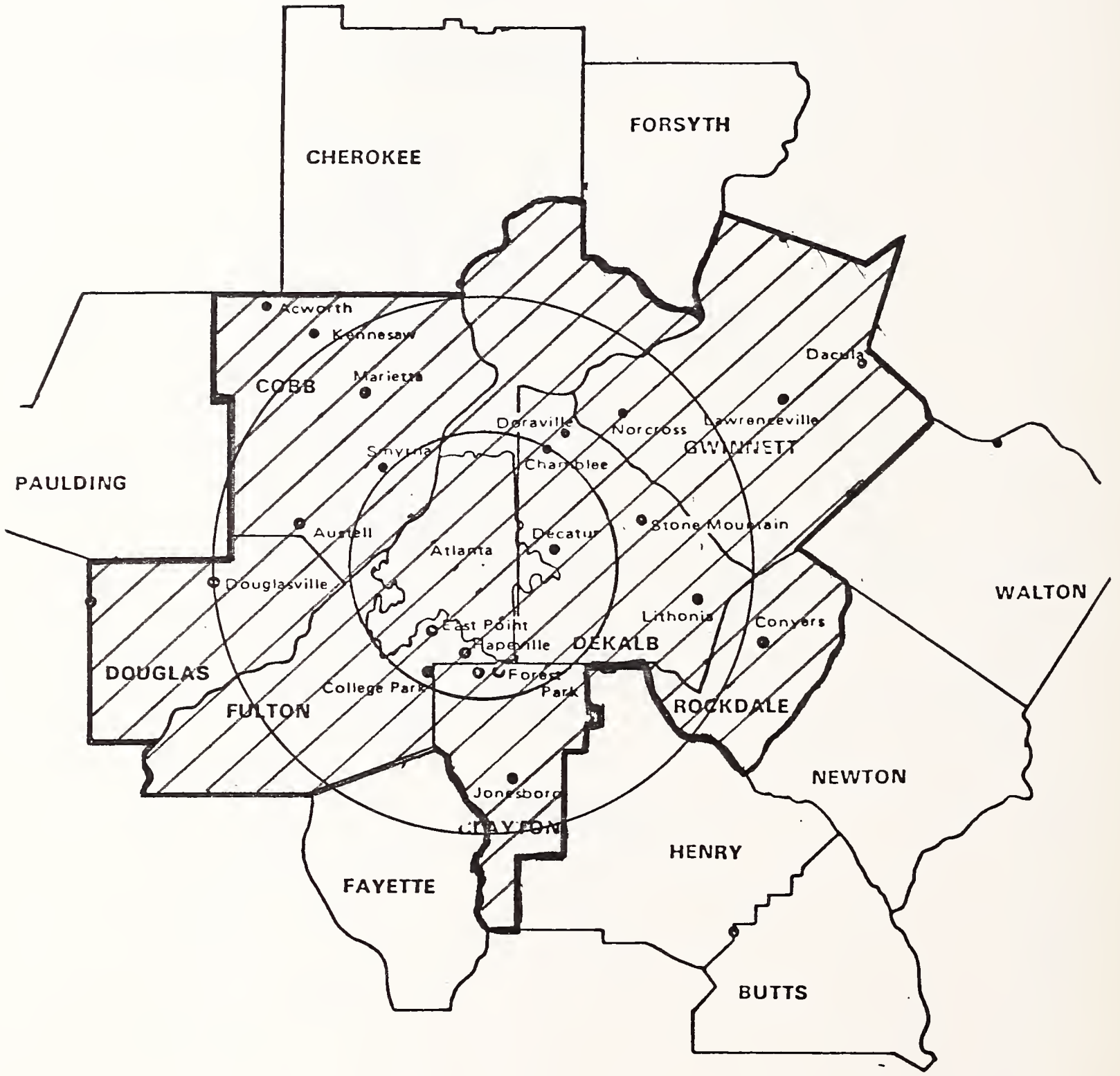


Square mileage
City limits 136
Five-county (Clayton, Cobb, DeKalb, Fulton, Gwinnett) 1,728
Fifteen-county area 4,326

EXHIBIT III-14

Fifteen-County Atlanta SMSA

(ATLANTA LOCAL-CALLING AREA)



Square mileage
- City limits 136
- Five-county (Clayton, Cobb, DeKalb, Fulton, Gwinnett) 1,728
- Fifteen-county area 4,326

APPENDIX A: DETAILED DATA

APPENDIX A

DETAILED DATA

			TERMINALS INSTALLED					TERMINALS SERVED			CPU-CPU LINES							
INTERVIEW NUMBER	BUSINESS ACTIVITY	NUMBER EMPLOYEES	TOTAL	DIAL-UP	PRIVATE LINE	LOCAL	COMPUTER CENTER	TOTAL	DIAL-UP	PRIVATE LINE	TOTAL	DIAL-UP	PRIVATE LINE	TRAFFIC VOLUME (MINUTES/DAY)	TRANSMISSION SPEED	NETWORK GEOGRAPHY	DIAL-UP NETWORK CONFIGURATION	APPLICATIONS
1	Mfg.	1,300	12	0	0	12	Yes	–	–	–	1	0	1	–	2,400	Toledo	Dial	–
2	Admin./Mfg.	500	–	–	–	–	Yes	38	1	37	–	–	–	–	–	–	Local	T/S
3	Admin.	500	30	0	1	29	Yes	–	–	–	1	0	1	–	–	–	–	–
4	Warehouse/ Sales	30	–	–	–	–	No	–	–	–	–	–	–	–	4,800	N.J.	–	FinOps
5	Warehouse	3,000	6	0	0	6	Yes	3	3	0	–	–	–	150	1,200	Atl.	Local	Prices
6	Admin.	400+	5	0	5	0	No	–	–	–	–	–	–	–	9,600	–	–	–
7	Banking	1,300	23	0	0	23	Yes	30	30	0	–	–	–	–	300	Atl.	Local	FinOps
8	Banking	200	75	0	0	75	Yes	–	–	–	–	–	–	–	–	–	–	–
9	Admin.	120	8	0	8	0	No	–	–	–	–	–	–	–	–	–	–	–
10	Admin.	80	4	0	4	0	Yes	–	–	–	2	0	2	–	–	–	–	Sales
11	Info Proc.	1,100	31	1	0	30	Yes	90	0	90	2	2	0	–	9,600	Atl.	Local	FinOps
12	Sales/Admin.	475	8	0	8	0	No	–	–	–	–	–	–	–	300	Florida	–	Admin.
13	Mfg.	225	–	–	–	–	Yes	–	–	–	1	0	1	–	–	Balt.	–	–
14	Mfg.	1,000	6	0	0	6	Yes	–	–	–	1	0	1	–	–	–	–	–
15	Mfg.	200	12	0	0	12	No	–	–	–	–	–	–	–	300	–	–	–
16	Mfg.	106	2	2	0	0	No	–	–	–	–	–	–	30	2,400	GA	Local	Orders
17	DP VC	150	52	2	0	50	Yes	–	–	–	–	–	–	240	1,200	U.S.	LD	Crd/Proc.
18	Admin.	300	76	1	0	75	Yes	–	–	–	–	–	–	–	300	Dayton	LD	T/S
19	Home Ofc.	900	–	–	–	–	Yes	150	125	25	–	–	–	20 Ins.	Various	S.E.	Wats	FinOps
20	Mfg.	180	9	0	9	0	No	–	–	–	–	–	–	–	4,800	Pittsb.	–	–
21	Mfg.	500	12	2	6	4	Yes	–	–	–	–	–	–	150	–	KY	LD	T/S
22	Mfg.	375	16	0	14	2	Yes	–	–	–	–	–	–	–	4,800	–	–	–
23	Mfg.	300	3	0	0	3	Yes	–	–	–	1	1	–	30	–	Dallas	Wats	Payroll
24	Admin.	75	20	0	0	20	Yes	7	7	0	–	–	–	45	4,800	U.S.	Wats	FinOps
25	Transport	500	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–

APPENDIX A (Cont.)

DETAILED DATA

			TERMINALS INSTALLED					TERMINALS SERVED			CPU-CPU LINES							
INTERVIEW NUMBER	BUSINESS ACTIVITY	NUMBER EMPLOYEES	TOTAL	DIAL-UP	PRIVATE LINE	LOCAL	COMPUTER CENTER	TOTAL	DIAL-UP	PRIVATE LINE	TOTAL	DIAL-UP	PRIVATE LINE	TRAFFIC VOLUME (MINUTES/DAY)	TRANSMISSION SPEED	NETWORK GEOGRAPHY	DIAL-UP NETWORK CONFIGURATION	APPLICATIONS
26	Sales/Admin.	140	1	0	1	0	Yes	–	–	–	2	2	0	350	1,200	Ohio	Wats	Sales
27	Admin./Mfg.	210	7	0	0	7	Yes	–	–	–	2	0	2	–	1,200	Atl.	–	Progm.
28	Corp. Ofc	75	6	0	0	6	Yes	3	1	2	–	–	–	200	2,400	SE	Wats	FinOps
29	Mfg./Admin.	230	13	1	9	3	Yes	–	–	–	1	1	–	15	2,400	Tenn.	LD	FinOps
30	Mfg.	500	3	0	3	0	No	–	–	–	–	–	–	–	–	Dallas	–	–
31	Mfg./Admin.	114	5	0	1	4	Yes	–	–	–	–	–	–	–	9,600	Phoenix	LD	Back-up
32	Agrc./Bnkg. Dairy Pro.	1,600	36	0	0	36	Yes	15	0	15	–	–	–	–	4,800	GA	–	–
33	Admin.	540	–	–	–	–	Yes	–	–	–	–	–	–	–	1,200	–	–	Data Bs.
34	Admin.	180	77	2	75	0	No	–	–	–	–	–	–	–	4,800	GA	Local	Progrm.
35	Trans./Admin.	300	5	5	0	0	No	–	–	–	–	–	–	–	1,200	U.S.	Corp.	FinOps
36	Mfg.	250	8	2	0	6	Yes	–	–	–	1	1	0	100	1,200	U.S.	LD	Progrm.
37	Admin.	200	46	1	0	45	Yes	–	–	–	–	–	–	50	1,200	N.Y.	LD	Credit
38	Prod./Admin.	300	19	1	0	18	Yes	–	68	–	1	1	0	200	1,200	U.S.	Wats	DataBse
39	Sales/Admin.	700	45	45	0	0	No	–	–	–	–	–	–	5,000	1,200	Mpls/Ind.	CCSA	T/S,Admin.
40	Mfg.	800	8	0	0	8	Yes	18	–	18	–	–	–	–	4,800	Atl.	–	–
41	D.P.	75	40	0	0	40	Yes	–	–	–	1	1	0	30	4,800	U.S.	Wats	–
42	Mfg.	5,000	2	2	0	0	No	–	–	–	–	–	–	–	300	–	CCSA	T/S
43	Mfg.	250	1	1	0	0	No	–	–	–	–	–	–	150	2,400	Toledo	Wats	Mfg.
44	Mfg./Admin.	150	6	0	0	6	Yes	1	1	0	–	–	–	60	4,800	Atl.	Local	Orders
45	Mfg.	350	22	0	22	0	No	–	–	–	–	–	–	–	2,400	–	–	–
46	Mfg./Admin.	155	6	0	6	0	No	–	–	–	–	–	–	–	4,800	Birming.	–	–
47	Mfg.	245	6	0	0	6	Yes	–	–	–	2	2	0	–	2,400	Miami	Wats	T/S
48	Mfg.	390	8	0	8	0	No	–	–	–	–	–	–	–	9,600	Dallas	–	Admin.
49	Mfg.	175	7	0	0	7	Yes	–	–	–	1	0	1	–	1,200	Atl.	–	Prog.
50	Mfg.	125	5	0	2	3	Yes	–	–	–	1	0	1	–	1,200	Atl.	–	–

DETAILED DATA

INTERVIEW NUMBER	BUSINESS ACTIVITY	NUMBER EMPLOYEES	TERMINALS INSTALLED				COMPUTER CENTER	TERMINALS SERVED			CPU-CPU LINES			TRAFFIC VOLUME (MINUTES/DAY)	TRANSMISSION SPEED	NETWORK GEOGRAPHY	DIAL-UP NETWORK CONFIGURATION	APPLICATIONS
			TOTAL	DIAL-UP	PRIVATE LINE	LOCAL		TOTAL	DIAL-UP	PRIVATE LINE	TOTAL	DIAL-UP	PRIVATE LINE					
51	Admin.	600	118	0	0	118	Yes	–	–	–	1	0	1	–	4,800	U.S.	–	–
52	Mfg./Admin.	280	16	0	0	16	Yes	–	–	–	–	–	–	–	–	–	–	Admin.
53	D.P.	800	311	66	0	245	Yes	740	–	740	–	–	–	–	–	GA	Local	T/S
54	Admin. Warehouse	80	2	0	0	2	Yes	–	–	–	–	–	–	–	–	–	–	–
55	Mfg. Warehouse	250	28	0	1	27	Yes	–	–	–	–	–	–	–	4,800	–	–	–
56	Admin.	300	14	1	6	7	Yes	–	–	–	–	–	–	30	9,600	LA	LD	Reports
57	Mfg.	300	13	0	13	0	No	–	–	–	–	–	–	–	9,600	KY	–	–
58	Mfg.	150	–	–	–	–	Yes	–	–	–	3	3	0	1,000	1,200	Atl.	Local	FinOps
101	Mfg.	200	28	0	8	20	Yes	–	–	–	–	–	–	–	4,800	U.S.	–	Orders
102	Mfg.	200	11	0	0	11	Yes	40	–	40	1	1	–	30	4,800	U.S.	–	Admin.
103	Mfg.	175	2	1	1	0	No	–	–	–	–	–	–	–	4,800	SFO	CCSA	FinOps
104	D.P.	550	–	–	–	–	Yes	5	5	0	–	–	–	150	4,800	U.S.	LD	Crd/Proc.
105	RCS	195	10	0	0	10	Yes	78	78	0	–	–	–	20,000	2,400	Atl.	Local	Service Acct.
106	RCS	195	20	0	0	20	Yes	300	40	260	–	–	–	16,000	1,200	SE	Local	Service
107	D.P.	150	1	0	0	1	Yes	205	0	205	–	–	–	–	–	GA	–	Tel/Trm
108	Banking	34	–	–	–	–	Yes	2	0	2	–	–	–	300	–	Atl.	–	–

APPENDIX B: SURVEY QUESTIONNAIRE FORM

CATALOG NO. YICS[ ][ ]

LOCAL DATA COMMUNICATIONS QUESTIONNAIRE

INPUT is studying the potential use of new and innovative data communications services for a major corporate client. Our primary focus in this study is the volume and nature of your organization's use of data communication terminals.

A. PHYSICAL LOCATION INFORMATION

1. Type of building.

   ( ) A multiple tenant office building.

   ( ) A single tenant building.

   ( ) An industrial park.

2. What is the primary activity at this specific location (administration, sales, research, etc.)?

3. How many employees at this location?

4. Is this your only location in Atlanta?

   ( ) YES ( ) NO

   If not, where else

How many more by year end 1981? _____

By year end 1982? _____

INPU

5a. Data terminals.

	NUMBER						
	MANU-FACTURER	MODEL NUMBER	DIAL-UP (POINT-TO-POINT) OR PRIVATE LINE	TRANS-MISSION SPEED	TODAY	YE81	YE 82
CRT'S							
SERIAL PRINTER/KEYBOARD DEVICES							
HIGH-SPEED BATCH TERMINALS							
TOTAL							

INPUT

CATALOG NO. YLCS□□□

5b. For each type of terminal:

5c. Where is the geographic location of the computer(s) or other device(s) with which it communicates?

6. If same metro area, how many miles?

7. Is this computer your own company's or another company's?

   o Whose?

8. What are these terminals for (what application(s)?

9. In how many separate locations (offices, rooms) are these terminals installed?

10. How is each physically connected to the communications link:

   ( ) Acoustic coupler
   ( ) Hard-wired modem
   ( ) Other. _____

INP

11. What type of communication line is used?

( ) PBX
( ) Separate business line
( ) Other. _____

12. What is the approximate number of calls made per day?

13. What is the approximate duration per call (minutes per call or number of characters per call)?

Minimum _____
Maximum _____

14. If a switched high-speed (e.g., 56 kilobit/second) transmission service were available, would your location have sufficient transaction volume to justify its use? (1 million characters per day or more.)

15. For what application(s)?

16. Are you aware of any other users of data terminals in your local organization?

17. In your building?

18. Can you suggest a person to contact?